From: Goldmann, Elizabeth
To: Julia Fonseca
Subject: 401 ltr re: rosemont mine
Date: Tuesday, March 25, 2014 11:03:00 AM
Attachments: 20140324_Comment Letter on DEQ Draft 401 Certification_FINAL Signed.pdf

Attachment not provided here; this attachment is provided in full in a separate document that has been released to FOIAOnline.

From: Goldmann, Elizabeth
To: Julia Fonseca
Subject: EPA comments SIR
Date: Wednesday, July 15, 2015 4:39:00 PM
Attachments: USEPA_Comments_RosemontSIR_031815_clean.docx

USEPA Comments on the March 2, 2015 Draft Rosemont Copper Project Supplemental Information Report – Provided March 18, 2015

Please note that the review time allowed for consideration of this document was relatively brief. EPA's review and comments provided below should not be assumed to include all potential concerns regarding this material, rather, they represent a best effort to provide feedback on a few key issues. Furthermore, these comments are not intended to supplant or supersede any comments made previously on these subjects.

Seep, Springs, and Riparian Areas

Overall comment: A range of model outcomes were assessed for Empire Gulch and Cienega Creek, all of which have high levels of uncertainty due to the long time frames, long distances, and relatively small amounts of drawdown involved. The effect of this uncertainty ripples through the rest of the analysis, resulting in conclusions with regard to probable outcomes that should be viewed as likewise inherently uncertain.

Pg. 37 - Analysis of Baseline Trends, Streamflow:
While some reaches show no statistically significant downward trends in streamflow, the actually trends/values should nevertheless be reported in relation to those reaches with statistically significant changes. If you have some reaches showing statistically significant trends and others that do not but are in the same trending direction, this suggests that the trends may still be biologically relevant. Aquatic organisms respond to real changes in flow and not statistical relationships. The same can be said about the precipitation trends beginning on pg. 35.

Pg. 39 - Wet/Dry Mapping:
Again, the approach downplays the ongoing observed trend in wetted stream length, citing that there is not significant statistical trend. This is misleading and may result in underestimating real impacts to aquatic organisms. For example, while a contracting wetted stream reach may show no significant statistical relationship, a contraction in a small linear distance can still have a large biological effect, especially when the available length of wetted channel is limited during the critical dry season.

Pg. 42:
"The riparian analysis relied on the following basic assumptions:

- *That the flow observed at the USGS stream gage on upper Cienega Creek during the period from 2001 to 2013 (a period of severe drought) was a reasonable representation of flow conditions in the future;*
- *That the cross-section at the gage location was similar in nature to elsewhere along upper Cienega Creek, Empire Gulch, and Gardner Canyon; and*
- *That predicted (i.e., modeled) groundwater drawdown could be superimposed directly on the historic observed stream hydrograph, and that the resulting new hydrograph could then be compared statistically with the historic observed hydrograph."* (emphasis added)

All three assumptions have serious flaws/limitations that may render any conclusions of impacts unreliable or meaningless.

Pg. 46:
"While the topography and effects on the individual pools are analyzed independently, the results are presented as an overall total for each key reach. The reason for this is the long time delay between the current field measurements and the predicted onset of groundwater drawdown from the mine. Impacts along Cienega Creek are not estimated to occur for at least 70 to 75 years after the start of mining.
It is not reasonable to expect that the specific individual pools measured would still exist in their current configuration at that time. ***However, the overall geomorphology of each key reach is assumed to remain similar, since substrate, slope, and bedrock controls would remain similar. In other words, even if the pools change or migrate, the overall number of pools per reach should remain similar****."* (emphasis added)

This assumption/logic is flawed and may result in underestimating impacts to individual pools within a reach. Changes in surface and groundwater hydrology are known to have effects on sediment transport and bank stability which may result in changes in channel substrate, siltation rates, and morphology. Such changes will likely affect reach specific pool numbers and dimensions. The assumption that the overall number of pools per reach will remain similar over time is likely not true. Rather, it is more likely that the number of pools in each will change over time as surface and groundwater conditions change.

Pg. 46:
"Climate change has been incorporated into the analysis by analyzing trends over the past decade and incorporating additional groundwater drawdown due to expected future changes in temperature.
Expected changes in precipitation have not been incorporated, since the trend analysis indicates that the hydrographs analyzed already reflect precipitation conditions similar to those expected to be experienced in the future." (emphasis added)

This logic seems flawed. Why wouldn't the effects of climate change be additive. The above assumes that the current drought is the result of climate change and not natural drought cycle variation. The FEIS should at least present two scenarios: one with current precipitation trends and another with an additive effect of climate change.

Pg. 47:
"In the FEIS, Gardner Canyon was analyzed as a stream reach. Based on information collected between May and November 2014, it does not appear that Gardner Canyon has perennial flow that supports a core aquatic system similar to those seen on Cienega Creek and Empire Gulch. ***No key reaches were identified on Gardner Canyon during the collaboration."*** (emphasis added)

It is not clear why we would drop Gardner canyon as a key reach because there is no perennial flow. Are we not concerned about effects to riparian systems?

Pg. 47 states:
"In the FEIS, wetland areas adjacent to Cienega Creek were analyzed as part of the overall riparian corridor. The collaboration identified one wetland area of particular importance not only from a biological standpoint, but because of its closer proximity to Empire Gulch and higher levels of predicted mine drawdown, as well as the importance for species reintroductions. ***Cieneguita Wetlands, which are located within the Empire Gulch floodplain upstream from the confluence with Cienega Creek, have been identified as a key reach."*** (emphasis added)

While we support inclusion of Cieneguita Wetlands in the impact analysis, we question why other wetlands were not included in the analysis.

Pg. 58:
"*The first statistic is commonly known as the P value. The P value can be described as the probability that the linear regression line would occur as calculated, if in reality there is no relationship between the explanatory and the response variables (i.e., the "null hypothesis" is true). In other words, the lower the P-value, the less likely the linear regression line is to have occurred purely by accident.*
Commonly, the P-value is used to determine significance as follows:

- $P \leq 0.01$. *Very strong presumption against null hypothesis.*
- $< P \leq 0.05$. *Strong presumption against null hypothesis.*
- $0.05 < P \leq 0.1$. *Low presumption against null hypothesis.*
- $P > 0.01$. *No presumption against the null hypothesis.*

For the purposes of this analysis, any P value less than or equal to 0.05 is considered statistically significant." (emphasis added)

The significance of the P-value is not determined by the test, but by the individual conducting the test. Using various arbitrary ranges of P -values to determine statistical significance is not particularly useful in determining biological significance for purposes of these analyses that are characterized by small sample sizes and conditions where small changes in measured outcomes may result in large, significant biological effects.

Experiment-wise error rates are not meaningful, because they are based on the idea of fixing alpa and have meaning only for the hypothetical situation where every null hypothesis being tested is true. The import of a low P value is not so much that it allows you to conclude the null hypothesis is false, but rather it is that a low P value indicates you have a good idea of the sign (-,+) and magnitude of the effect. A high P value means you can't even be sure about the sign of the true effect, let alone of its magnitude. The statistical analysis uses fixed experiment-wise error rates to determine significance, but there are simply no good reasons to do so. We should be evaluating the gradations and strength of the evidence. There is no sharp dividing line between probable and improbable results.

Pg. 59 – USGS Review of Linear Regression Analysis:

EPA concurs with USGS regarding their caution on the reliance of a single piezometer for the linear regression analysis. Although this is additional information for consideration, we do not believe it is sufficient upon which to draw conclusions. This is especially so given that other variables such as geology, climate and drought are not included in this analysis. EPA is concerned with the use of extrapolation. Whenever a linear regression model is fit to a group of data, the range of the data should be carefully observed. Attempting to use a regression equation to predict values outside of this range is often unreliable, resulting in forecasting error.

Pg. 63 – Climate Change Stress Analysis:

"With respect to precipitation amount, review of the current trends (see appendix B) indicates that during the current ongoing drought, between 2001 and 2014, precipitation has already been in the overall range predicted by climate change (see appendix B, figures B3, B4, and B5). As indicated in the FEIS, one driving factor behind adopting the hydrograph analysis technique used in the FEIS and this SIR is that it incorporates a period of severe drought into future predictions: "The patterns seen in Southern Arizona in the past few decades, and particularly on Cienega Creek, provide a template for what long-term climate change could look like. Prolonged droughts brought on by climate change could result in similar shifts from perennial to intermittent flow along upper Cienega Creek and Empire Gulch" (FEIS, p. 566)."

Please explain why climate change effects are not additive to current temperature and precipitation conditions. The assumption in the SIR is that current conditions are due to climate change and this has not been proven true. The fact that mean annual temperatures do not reflect climate change models suggests that the current drought may be, in part, the result of natural precipitation.

EPA finds that this analysis is highly speculative and therefore predictions based this analysis should be treated with caution.

Pg. 65 - Sources of Uncertainty and the 95th Percentile Analysis

The SIR analysis attempts to condense the modeling scenarios and parameters into a single useful prediction that incorporates all sources of uncertainty. Two factors were incorporated to create a single range that would be expected to represent 95 percent of the possible outcomes. For each key reach, each time step, there are predictions of drawdown from 37 to 38 modeling scenarios. The drawdown from these outcomes was ranked and the 95th percentile range was calculated. In addition, the 95 percent confidence interval was calculated using a linear regression analysis. The SIR states these two factors were then combined to create a single low and single high scenario with 95% of all outcomes falling with the range of these two scenarios.

In addition to the uncertainty of the models, combining different models with different assumptions and condensing them into a single prediction based on the 95th percentile range is not meaningful. It does not provide greater certainty in predicting the impacts of groundwater drawdown from the mine on surface waters. Furthermore, combining this single outcome with the results of the 95% confidence interval of the linear

regression analysis to obtain a single low and single high scenario to explain a range of effects from groundwater drawdown is not meaningful or appropriate.

Pg. 65:
"The Coronado determined that incorporating additional stresses due to basin growth would be speculative and is not warranted."

This is a serious analytical shortcoming of the analysis as stresses related to future growth in basin water use may result in additive/cumulative effects that significantly increase the likelihood of adverse effects to aquatic/riparian communities when considered with the effects of mine groundwater drawdown. A range of possible effects from basin stressors should be incorporated into the modeling.

Pg. 66 and Table 12:
"*As previously discussed, there is also statistical uncertainty also in the translation of groundwater drawdown into reductions in stream flow, which was developed using linear regression of available field data. In this case, the 95 percent confidence interval[5] can be calculated within which we know that 95 percent of the possible regression slopes would fall."*

A number of problematic assumptions regarding the application of the data and of certain statistical analyses of these data bring into question the validity and usefulness of the presented range of results. Therefore, all results should be viewed with caution as they may not reflect actual potential outcomes.

Pg. 83 Seasonal Correction:
"It is recognized that this pool survey was not conducted during the same time of year that is of interest for the presence of refugia pools. Although the pool survey was conducted in November and December during a period that generally is not influenced by runoff, similar to the critical low-flow period in May and June, groundwater levels potentially sustaining the pools during May and June would likely be lower."

This reflects a serious sampling problem. Pool surveys should be conducted during the May-June driest period to verify that the November-December samples are representative when adjusted to the seasonal correction factor.

Pg. 184 - Climate Change.
"*Upper Empire Gulch: The magnitude of potential mine-related impacts is expected to be greatest in Upper Empire Gulch. While climate change would have an impact on stream flow and pool volume, the effects of climate change on the water resources in this area would not substantially add to the effects of the Barrel Alternative due to the magnitude of the potential mine-related impacts. Therefore, no substantial additional impacts to biological resources or species known to occur in DRAFT Rosemont Copper Project Supplemental Information Report – March 2, 2015 185 Empire Gulch Reach 1 (i.e., Chiricahua leopard frog, northern gray hawk, northern beardless tyrannulet, western yellow-billed cuckoo, southwestern willow flycatcher, and Abert's towhee) are expected in this location as a result of climate change.*

Cienega Creek: The mine drawdown alone is expected to have no or little effect on drying of the stream. However, the climate change scenario by itself would have a substantial effect on stream flow and pools, particularly in the downstream reaches of Cienega Creek, where days of zero flow would increase, and though the number pools are not expected to decrease, their volume would. Further, the lower reaches would see greater reductions than higher reaches. Thus, climate change by itself is likely to reduce the habitat extent and quality for aquatic species at Cienega Creek. Impacts to aquatic species occurring here (Huachuca water umbel, Chiricahua leopard frog, lowland leopard frog, northern Mexican gartersnake, longfin dace, Gila chub, and Gila topminnow) are expected to include the loss of habitat, reduction of habitat quality, and increased predation, particularly in lower reaches of Cienega Creek."

If climate change alone is expected to have significant impacts to Cienega Creek aquatic habitats and species, then how can one conclude that climate change would not add substantially to the impacts from the Barrel Alternative

at Upper Empire Gulch. This is not logical…the effects of climate change would be additive and therefore significant.

Appendix E. - Linear Regression Analysis for Groundwater Depth Versus Streamflow

Several tables are provided presenting a Summary of the Regression Analysis outputs. With limited information, EPA is unclear on some of the statistical analysis performed. It appears that multiple samples from each experimental unit are taken rather sequentially over several dates. Dates are then taken to represent replicated treatments and significance tests are applied. Treating successive dates as if they are independent replicates of a treatment is invalid. EPA recommends a re-evaluation of the statistical analysis conducted on the groundwater/streamflow data.

From: Goldmann, Elizabeth
To: Leidy, Robert
Subject: FW: contact information
Date: Monday, July 21, 2014 11:36:00 AM

-----Original Message-----
From: dbear (b) (6)
Sent: Monday, July 21, 2014 11:32 AM
To: Goldmann, Elizabeth
Subject: contact information

Elizabeth, here is the contact information we discussed. Let me know if you need any further information. All the best, Dinah

Mr. Richard Walden, President
Ms. Nan Walden, JD, Vice President and Counsel
Farmers Investment Co. (FICO)
Green Valley Pecan Company
(b) (6)

Mr. Walden's assistant: Kathryn Liptak direct line:
(b) (6)

Ms. Walden's assistant: Meranda Scott;

(b) (6)

From: Goldmann, Elizabeth
To: Julia Fonseca
Cc: Leidy, Robert
Subject: RE: ADEQ Basis for State 401 Certification Decision for Rosemont Copper Project
Date: Tuesday, March 25, 2014 3:12:00 PM

Thank you!

From: Julia Fonseca [mailto:Julia.Fonseca@pima.gov]
Sent: Tuesday, March 25, 2014 3:07 PM
To: Goldmann, Elizabeth
Cc: Leidy, Robert
Subject: FW: ADEQ Basis for State 401 Certification Decision for Rosemont Copper Project

FYI, in response to your question.

From: Evan Canfield
Sent: Tuesday, March 25, 2014 2:36 PM
To: Julia Fonseca; Akitsu Kimoto
Subject: RE: ADEQ Basis for State 401 Certification Decision for Rosemont Copper Project

Hello Julia,

The Patterson and Annandale memo is a very high level evaluation with some arm-waving conclusions. They make the case that there is a bedrock-controlled pinch-point downstream of Hwy 83, and note that sediment deposits upstream of this. However, they also note that … *Streams such as these have extremely high sediment transport rates (for example, Reid, et al., 1998 and Greenbaum and Bergman 2006).* Then they go on to conclude that … *Barrel Creek is a classic example of a sediment-transport limited system.* How can both statements be true? I suspect it is because *Reid, et al., 1998 and Greenbaum and Bergman 2006* actually measured it.

My point would be that their photos and observations do not tell the whole story. We live in basin and range where sediment from the mountain has created deep valley fill. The fact that Patterson and Annandale have identified some places where grade controls maintain channel elevation does not negate the big picture. These streams do have high sediment transport rates even if they are rock lined. Watersheds are steep with limited cover, and there is a lot of sediment supply (Langbein –Shumm curve has us some of the highest in the world). Sediment is transported in suspension as well as bed load, and by looking at the stream bed they are claiming to understand sediment dynamics as a whole. Significant volumes of suspended sediment could be easily carried beyond this pinch point.

They continue to build on the idea that impact of the mine is proportional to the catchment

area and cite previous Rosemont Reports (they note that the mine is only 13% of watershed) without looking at the sediment supply potential differences across the watershed. I believe removing sediment supply from Barrel Canyon will have a proportionally greater impact, because the mine site is steeper and gets more rainfall than the portion further down.

I think comments c and d from our previous letters are still valid:

c. The impacts of mining activities on sediment transport could change over time during the active mine life and after the closure. The FEIS reported that the reach of Davidson Canyon is currently a sediment transport-limited system. However, with a reduction in sediment load from the project area over time, it is possible that loose sediment is washed out and as a result the sediment transport system could be changed. The changes in sediment balance could affect the fluvial geomorphology of the Davidson Canyon and Cienega Creek. Appropriate sediment transport analysis is necessary to estimate long-term impacts of mining activities on channel geomorphology, vegetation and fluvial system of the "Potential Waters of the United States". Cumulative impacts of possible changes in sediment transport system on "Potential Waters of the United States" over time should be disclosed. County PAFEIS comments, p. 78.

d. The FEIS acknowledged that there will be a reduction in sediment yield from Barrel Canyon watershed but no change in the geomorphology of the channel is expected. The FEIS only discusses about annual average sediment delivery. The FEIS did not consider cumulative impacts of sediment delivery change over the active mine period and post-closure. Considering the proposed active mine life is over 20 years, the FEIS should assess long term impacts on sediment yield, delivery and channel geomorphology. County PAFEIS comments, p. 79.

Evan

From: Julia Fonseca
Sent: Tuesday, March 25, 2014 11:08 AM
To: Evan Canfield; Akitsu Kimoto
Subject: FW: ADEQ Basis for State 401 Certification Decision for Rosemont Copper Project
Importance: High

Evan/Akitsu, please comment on the assumption that fill activities in Barrel and tribs will not affect geomorphology downstream. I take it from your objections that you would say that the information is not available to make that determination?

And their assumption that the grade controls mentioned below would limit downstream erosion in the OAW reach? How can that be?

From: Goldmann, Elizabeth
To: Julia Fonseca
Subject: RE: Rosemont ADEQ 401 Certification Comments
Date: Tuesday, April 08, 2014 5:26:00 PM
Attachments: Rosemontdraft401cert.EPAcommentltr.pdf

Thank you Julia! We submitted a letter yesterday to ADEQ. Chuck H. was copied, but I am providing you with a copy in case you haven't seen it.

E.

From: Julia Fonseca [mailto:Julia.Fonseca@pima.gov]
Sent: Tuesday, April 08, 2014 4:53 PM
To: Goldmann, Elizabeth; Leidy, Robert
Subject: FW: Rosemont ADEQ 401 Certification Comments

Can't remember if I sent this to you!

From: Deborah Haro
Sent: Friday, April 04, 2014 3:00 PM
To: 'rosemont401comments@azdeq.gov'
Cc: kmcolloton.spl@usace.army.mil; 'Jared Blumenfeld (blumenfeld.jared@epa.gov)'
Subject: Rosemont ADEQ 401 Certification Comments

Good afternoon Mr. Scalamera,

Please see the attached correspondence from Mr. Huckelberry regarding the above subject. The original letter will be provided to you via US mail.

Thank you,
Debbie

Deborah Haro
Pima County Administrator's Office
130 W. Congress Street, Floor 10
Tucson, Arizona 85701
Deborah.Haro@pima.gov
(b) (6) [redacted]

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

APR 07 2014

Michael Fulton, Water Quality Division Director
Arizona Department of Environmental Quality
Surface Water Section/State 401 Certification/MS 5415A-1
1110 West Washington Street
Phoenix, Arizona 85007

Subject: State of Arizona Clean Water Act (CWA) Draft Section 401 Water Quality Certification for the Rosemont Copper Project, Pima County, Arizona

Dear Mr. Fulton:

Thank you for the extended opportunity to review the draft CWA Section 401 water quality certification (certification) and supporting information for discharges associated with the proposed Rosemont Copper Project. With Arizona's designation of portions of the Cienega Creek watershed as "Outstanding Arizona Waters" (OAWs), the EPA supports the state's broadest exercise of legal discretion to protect these remarkable resources. We are submitting the enclosed comments as a continuation of our interagency coordination on the mine's potential water quality consequences to the OAWs of the Cienega Creek watershed.

After careful consideration, EPA believes the draft certification and supporting information provide an insufficient basis from which to conclude existing water quality will be maintained (*e.g.*, ongoing attainment of designated beneficial uses). In general, the draft certification relies on lagging indicators (post-discharge monitoring) to trigger corrective actions, rather than a preventative approach to ensure the protection of water quality in the OAWs. Those corrective actions also lack critical specificity with regard to water supply, the ability to arrest and reverse water quality problems should they be detected, and the enforceability of conditions given varying jurisdiction over proposed monitoring areas.

The U.S. Forest Service's Final Environmental Impact Statement (FEIS) and supporting documentation conclude that the Rosemont Copper Project will adversely modify surface and groundwater hydrology, sediment transport, and pollutant loadings in the watershed. EPA believes the available evidence indicates a substantial risk to designated beneficial use standards (*e.g.*, fish, wildlife and habitat) set by the state for Davidson Canyon and Cienega Creek. The EPA recommends that no 401 certification be issued unless the discharger can implement specific preventative actions that provide a high degree of confidence that designated uses will be maintained.

Please do not hesitate to contact me with any questions or concerns you may have regarding the enclosed comments at (415) 947-8707.

Sincerely,

Jane Diamond
Director
Water Division

cc: Jim Upchurch, U.S. Forest Service
Colonel Kimberly Colloton, U.S. Army Corps of Engineers
Jean Calhoun, U.S. Fish and Wildlife Service
Ray Suazo, Bureau of Land Management
Chuck Huckelberry, Pima County

EPA Region 9 comments on the *Draft Section 401 Water Quality Certification for the Rosemont Copper Project* dated February 21, 2014 (Draft 401 Certification), and the *Basis for State 401 Certification Decision Rosemont Copper Project ACOE Application No. SPL-2008-00816-MB* (Basis for Decision)

Protecting "Outstanding" Water Quality Downstream of the Rosemont Mine

The State of Arizona has designated reaches of both Davidson Canyon and Cienega Creek as OAWs due to, among other factors, their exceptional ecological and recreational significance and the presence of federally endangered and threatened species. Water quality in these reaches currently meets or exceeds applicable water quality standards, and any lowering of water quality in OAWs is prohibited.

ADEQ states in its Basis for Decision that, "In order to issue a State 401 water quality certification, ADEQ must be satisfied that any modifications to hydrology, sediment transport or water quality, as a result of the proposed activities under the § 404 permit, will not result in adverse water quality impacts to the downstream OAWs."[1]

Rosemont Mine proposes no direct discharges to OAWs. However, as ADEQ acknowledges in its Basis for Decision, "As part of its certification process, ADEQ may impose additional controls, conditions or mitigation measures, on indirect discharges that occur upstream of or to tributaries of an OAW to maintain and protect existing water quality in a downstream OAW."[2]

ADEQ has proposed the following additional measures in its Draft 401 Certification to maintain and protect existing water quality in Davidson Canyon and Cienega Creek:

5.2 Specific Conditions

1) Within 180 days of the effective date of the CWA 404 permit, the applicant shall submit to ADEQ, for review and approval, a surface water mitigation program designed to maintain aquatic and riparian resources at pre-project levels in Davidson Canyon and Lower Cienega Creek. The program shall include, but is not limited to, a description of measures that will be taken to offset predicted reductions in surface water flow, in response to the project, along with a proposed schedule for implementation. The Final Environmental Impact Statement (FEIS) predicts a 17.2% reduction in average annual post-closure stormwater runoff volume as a result of the proposed activities. The surface water mitigation program shall describe measures that will offset the reduced runoff volume should it occur. The draft mitigation program shall be submitted to the address and contact person in Section 4.0.

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[1] Basis for Decision at pg. 2.

[2] Basis for Decision at pg. 2; *see also* ADEQ Draft Antidegradation Implementation Procedures (April 2008) at pg. 4 ("ADEQ will impose whatever controls are necessary on indirect discharges that occur upstream of or to tributaries of an OAW to maintain and protect existing water quality in a downstream OAW.") Available at: http://www.azdeq.gov/environ/water/standards/download/draft_anti.pdf.

> The mitigation program shall identify measures, as necessary, to ensure that any water used to mitigate a predicted reduction in stream flows, meets applicable Arizona surface water quality standards, including for Outstanding Arizona Waters, where applicable.
>
> Within 30 days of ADEQ approval of the program, the applicant shall implement the approved mitigation program in accordance with the schedule set forth in the approved program. Should the results of required monitoring and/or revised hydrologic modeling (FEIS Mitigation Measures FS-BR-22, FS-BR-27, FS-GW-02, FS-SR-05) indicate that water quality in Davidson Canyon or Lower Cienega Creek is adversely affected by the activities certified herein, ADEQ may request that the COE suspend the CWA 404 Permit and require additional mitigation.

ADEQ found that if Rosemont adheres to the conditions and mitigation in the 401 Certification (*i.e.*, Specific Conditions 5.2), and also to CWA § 404 permit conditions, the U.S. Forest Service's Final Environmental Impact Statement's (FEIS) mitigation measures, and the State's 2010 Mining AZPDES Multi Sector General Permit's requirements, then the Rosemont Copper Project should not cause or contribute to exceedences of surface water quality standards nor cause water quality degradation in the downstream receiving waters including Davidson Canyon Wash and Cienega Creek.[3] ADEQ based its finding on a consideration of the following 5 factors:

1. Change in ambient concentrations predicted at the appropriate critical flow conditions and the nature, persistence and potential effects of the parameter;
2. Changes in loadings and the nature, persistence and potential effects of the parameter;
3. Reduction in available assimilative capacity;
4. Degree of confidence in the various components of any modeling technique utilized; and
5. Potential for cumulative effects.

After a careful review of ADEQ's consideration of these five factors, EPA believes ADEQ's certification decision, and its finding that the current conditions and mitigation in the 401 certification (*i.e.*, Specific Conditions 5.2) will prevent water quality degradation in Davidson Wash and Cienega Creek, is not justified and the risk of water quality degradation remains high. EPA provides further consideration of the five factors, as discussed below:

Factors 1 and 2: Sediment is a critical and under-analyzed water quality parameter

As ADEQ correctly acknowledges in its Basis for Decision, changes to sediment transport in streams can adversely affect water quality by increasing total suspended sediment in surface water flows and altering the physical integrity of the system, thereby causing problems with scour or aggradation which have the potential to result in water quality degradation.[4] ADEQ also recognizes that potential impacts on surface water quality due to the proposed fill activities could include changes in downstream sediment yield and therefore changes in geomorphology caused by the loss of waters of the U.S.[5] Yet,

[3] Basis for Decision at pg. 3.
[4] Basis for Decision at pg. 8.
[5] Basis for Decision at pp. 6 and 8.

ADEQ concludes that the proposed fill activities will not have a significant impact on the geomorphology of Barrel and Davidson Canyons.

To draw these conclusions of no significant impact, ADEQ relies on a very limited review of sediment transport effects. ADEQ uses the US Forest Service's (USFS) geomorphic assessment of Barrel Creek by Patterson and Annandale (2012), a 2-day survey using three variables: sediment availability, channel geometry, and water flow. Patterson and Annandale reason that since the Rosemont mine impacts 13% of the entire catchment area, there would not be significant impact to the fluvial geomorphology of the stream system.[6] This conclusion presumes a simple and direct proportionality of the Rosemont mine's sediment contribution to other parts of the watershed, and considers no temporal variability. In reality, the impacts of mining activities on sediment transport are likely to change over time during the active mine life and after closure, with potentially significant consequences to channel stability and aquatic and riparian habitat. Thus, suspended and bedload transport analyses are necessary to evaluate the impacts to OAWs from mine-driven sediment changes.

Without the benefit of these additional analyses, EPA believes that ADEQ would be premature to conclude that there will be little change to lower Davidson Canyon's geomorphology (and water quality) as a result of the fill.

Factor 3: Reduction in available assimilative capacity

According to the FEIS, natural stormwater runoff that currently feeds the OAWs will be diminished up to 40% over the 24.5 – 30 year life of the mine.[7] ADEQ acknowledges a post-closure reduction in runoff volume of 17.2%, and concludes that this reduction could result in a potential loss of assimilative capacity and therefore potential degradation of water quality and/or riparian areas.[8]

For 404 permitting purposes, the Corps of Engineers requested that Rosemont conduct an analysis of indirect impacts from stormwater diversion. Considering the attenuation of impacts as the contributing watershed becomes larger, Rosemont calculated a reduction in average annual volume of stormwater flow in the Davidson Canyon OAW of approximately 8%, resulting in indirect impacts to 2.2 acres of surface waters within the OAWs during Rosemont mine operation.[9] EPA maintains Rosemont's analysis is flawed and the reduction in stormwater flow will adversely affect the entire wetted channel of the OAW. Rosemont did not calculate the indirect impacts to Lower Cienega Creek.

To address predicted reductions in runoff volume, the draft certification proposes that Rosemont develop and implement a surface water mitigation program designed to maintain aquatic and riparian resources at pre-project levels in Davidson Canyon and Lower Cienega Creek. The program shall include measures to offset predicted reductions in surface water flow (17.2% at post-closure), and a proposed schedule for implementation.[10]

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[6] Basis for Decision at pg. 8.
[7] FEIS, Volume 2, Chapter 3, Table 66. Summary of effects
[8] Basis for Decision at pg. 10.
[9] Email from Brian Lindenlaub, Westlands Resources, to Elizabeth Goldmann, EPA dated January 15, 2014.
[10] Basis for Decision at p. 11, Draft 401 Certification, Specific Condition 5.2.1.

EPA appreciates ADEQ's inclusion of this Special Condition. EPA, however, is concerned that there is inadequate detail or certainty about the prospective surface water mitigation program's ability to offset the reduction in available assimilative capacity. For instance, EPA believes that since the 401 certification's coverage extends over the entire active mine period, and since the natural stormwater runoff that currently feeds the OAWs will be diminished up to 40% over the 24.5 – 30 year life of the mine, the mitigation targets should be based on the 40% surface runoff reductions predicted during the life of the mine, as opposed to the 17.2% post-closure reductions estimated by ADEQ.

In addition, the potential strategies described in the draft 401 certification to offset loss (*e.g.*, purchasing, retiring, severing and transferring of water rights) depend on administrative actions that are not certain to occur. Without certainty of measurable water supply and delivery, and corresponding contingencies for failure to secure such water, EPA does not believe these activities may be reasonably relied upon to replace the loss of wet water in the OAWs and prevent their degradation. We therefore recommend that ADEQ have Rosemont submit its surface water mitigation program to ADEQ for approval *prior* to issuance of the 401 water quality certification to ensure that Rosemont has secured enough available "wet" water to maintain aquatic and riparian resources at pre-project levels in Davidson Canyon and Lower Cienega Creek.

Factor 4: Degree of Confidence in various components of any modeling technique utilized

In its Basis for Decision, ADEQ correctly notes the uncertainty of the USFS models in predicting impacts to downstream waters.[11] ADEQ concludes that based on modeling and observation (*e.g.*, models, Tetra Tech field observations, SRK Consulting review), Lower Davidson Canyon is not hydraulically connected to the regional aquifer that would be impacted by pit dewatering.[12] With regard to Lower Cienega Creek, ADEQ states the potential reduction in perennial stream flow would be driven by the reduction in contribution from both Davidson Canyon and Upper Cienega Creek, but this reduction in surface flows would be minimal.[13]

The EPA believes that the uncertainty associated with available modeling does not support the above conclusions. Uncertainty equates to greater risk, which argues for a more protective or precautionary application of standards.

As previously stated, changes in sediment loading and a reduction in assimilative capacity will adversely affect water quality in Davidson Canyon and Lower Cienega Creek OAWs. In addition, pit dewatering will adversely impact approximately 20 miles of the Upper Cienega Creek OAW. According to the FEIS, the best-fit models show that mine related groundwater drawdown will result in intermittent conditions in Upper Cienega Creek after 150 years. By 150 years after closure, the risk of dry or low-flow conditions occurring in Upper Cienega Creek would increase to 88-283 days per year. Another model estimate shows Cienega Creek becoming intermittent within 50-150 years.[14] As a contributing

[11] Basis for Decision at p. 11.
[12] Basis for Decision at p. 11.
[13] Basis for Decision at p. 13.
[14] FEIS, Chapter 3, Table 108.

surface water source to Lower Cienega Creek, reductions in flow in Upper Cienega Creek will result in degradation of water quality in downstream OAW receiving waters.

Factor 5: Potential for Cumulative Impacts

EPA concludes from a careful read of the evaluation of cumulative impacts contained in the Basis for Decision that the scope and magnitude of impacts associated with the proposed Rosemont Copper Project, and the context in which these impacts will occur, have not been adequately presented.[15] The Rosemont mine represents an assemblage of impacts that are additive to the existing trend of declining water availability due to climate change, drought, and other factors. Insufficient information is provided in the draft certification and the Basis for Decision to demonstrate that the implementation of a surface water mitigation program will replace flows being captured or truncated from the proposed mine, either as a stand-alone impact or in the context of cumulative impacts to water quality such as drought and climate change.

Monitoring for sediment and flow changes

In general, impacts should be avoided wherever practicable prior to contemplating ways they can be minimized or mitigated. In the case of water quality in OAWs, impacts must be avoided by definition. The draft certification proposes corrective action should impacts to geomorphology occur, but it is unclear whether corrective measures can be put in place to prevent the degradation of OAWs should scour or aggradation be detected, or whether these measures can be effective given the potential lag time between detection and implementation of potential remedies.[16]

The USFS will require the Rosemont mine to monitor sediment between the mine and SR83 to identify areas of scour or aggradation (FEIS mitigation measure FS-SR-05), and Rosemont has agreed to share these data with ADEQ. However, these measures are only applicable on USFS lands; the USFS has no authority, obligation, or expertise to determine or enforce compliance with other agencies' laws or regulations.[17] In addition, based on the monitoring locations on USFS lands, it is questionable whether these monitoring measures and sites would capture changes to the beneficial uses associated with water quality standards at downstream OAWs.

EPA also believes Specific Condition 5.2.1 would benefit from a clearer description of the suspension procedures triggered if degradation is detected. Currently, the draft certification's proposed condition 5.2.1 states that ADEQ "may request" suspension of the CWA 404 permit if degradation is detected and require additional mitigation. However, the condition lacks specificity on implementation and timing of the suspension process and remedies, if any, should monitoring show degradation of an OAW. At minimum, adverse changes in water quality detected in OAWs should require immediate suspension of the 401 certification (and thus of the CWA 404 permit).

[15] Basis for Decision at p. 13.
[16] Basis for Decision at p. 8.
[17] FEIS, Appendix B, Page B-3

Other Water Quality Concerns

A Corps Memorandum dated October 29, 2009 addresses water quality certification as follows, "The state's certification of compliance with applicable effluent limitations and water quality standards will be considered conclusive with respect to water quality considerations, unless the Regional Administrator (RA) of the U.S. Environmental Protection Agency (U.S. EPA) notifies the district engineer of "other water quality aspects" that should be taken into consideration when making a decision on a permit application for an activity that results in a discharge of dredged or fill material into waters of the United States."[18]

EPA first notified the District Engineer of water quality concerns in a letter dated February 13, 2012. If the state's 401 water quality certification is not modified to adequately address the concerns regarding the protection of Davidson Canyon and Cienega Creek, EPA expects to request the District Engineer evaluate these particular water quality issues raised and documented by EPA both for purposes of the Corps public interest review at 33 CFR 320.4(d) and compliance with 40 CFR 230.10(b)(1) in the decision document for the §404 Clean Water Act permit action.

[18] Memorandum for Major Subordinate Commands and District Commands Subject: Water Quality Certification dated October 29. 2009 at p. 1.

From:	Goldmann, Elizabeth
To:	Julia Fonseca
Subject:	"Other Water Quality Aspects" of permit issuance for Rosemont mine in light of state actions under section 401 CWA
Date:	Thursday, April 16, 2015 12:52:00 PM
Attachments:	Letter to Colonel Kim Colloton.pdf

Attachment not provided here; it has been released in full with a separate document and appears in full on FOIAOnline

Hi Julia

I am providing you with a copy of EPA's letter to the Corps regarding Other Water Quality Aspects of permit issuance under section 401 CWA for the proposed Rosemont copper mine. Please contact me if you have any questions.

Best,
Elizabeth

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

APR 14 2015

OFFICE OF THE
REGIONAL ADMINISTRATOR

Colonel Kim Colloton
District Engineer, Los Angeles District
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

Subject: "Other Water Quality Aspects" of permit issuance for the Rosemont Mine in light of state actions under §401 of the Clean Water Act

Dear Colonel Colloton:

On February 3, 2015, the Arizona Department of Environmental Quality (ADEQ) issued the Clean Water Act (CWA) §401 Water Quality Certification (certification) for the proposed Rosemont Copper Project (Rosemont mine) in Pima County, Arizona. After careful review and consultation with the state, EPA has determined that the impacts of the project include substantial water quality aspects which may be outside the scope of the state's §401 certification review. Thus, EPA believes the certification alone is unlikely to provide sufficient measures to safeguard the water quality of the Cienega Creek watershed, including stream reaches meeting or exceeding existing water quality standards under CWA §303 (these CWA "Tier 3" waters in Arizona are designated "Outstanding Arizona Waters" or OAW).[1] As prescribed under Corps regulations at 33 CFR 320.4(d), I am requesting your consideration of these "other water quality aspects" when making your §404 CWA permit decision.[2]

The Rosemont Copper Project Final Environmental Impact Statement (FEIS) and other documentation concluded the Rosemont mine, if constructed, would adversely modify surface and groundwater hydrology, sediment transport, and pollutant loadings in the watershed. The state CWA §401 certification lacks sufficient, specific preventative actions to avoid these adverse impacts to water quality, creating a substantial risk to designated beneficial use standards set by the state for Davidson Canyon and Cienega Creek. In general, the certification relies upon limited, voluntary (i.e., non-enforceable) post-discharge monitoring that may detect water quality degradation after it occurs, and includes insubstantial corrective actions to be developed at a later time. Many of EPA's concerns identified in comments on the state's February 21, 2014 draft certification (letter attached) remain unaddressed by the final certification. Among the most critical water quality aspects that remain outstanding are:

1. **Water quality impact avoidance:** Without reasonable assurance of impact avoidance, the available information suggests Tier 3 antidegradation standards are very likely to be violated.

[1] Federal antidegradation policy prohibits any degradation of Tier 3 waters, regardless of economic or social development needs (40 CFR 131.2(a)). Arizona's anti degradation rules reinforce this prohibition (ACC R18-11-107).
[2] Corps Regulatory Guidance Letter 90-04 and the Memorandum for *Major Subordinate Commands and District Commands* dated October 29, 2009

From: Goldmann, Elizabeth
To: Julia Fonseca
Subject: water quality data for DC
Date: Thursday, November 19, 2015 2:51:00 PM

Hi Julia,

FYI, Here is the Water Quality/Water Level Data for the USFS from Hudbay dated January 16, 2015. The second link includes the location of the DC monitoring station (DC-3).

http://rosemonteis.us/files/references/048930.pdf

http://www.rosemonteis.us/documents/water-earth-tech-davidson-canyon-conceptual-sw-monitoring-plan-201203